STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

December 23, 1999

Christopher B. Fisher
Cuddy, Feder & Worby
90 Maple Avenue
White Plains, NY 10601-5196

RE: EM-AT&T-107-991213 - AT&T Wireless PCS notice of intent to modify an existing telecommunications tower located at 525 Orange Center Road in Orange, Connecticut. (Docket No. 177A).

Dear Attorney Fisher:

At a public meeting held on December 20, 1999, the Connecticut Siting Council (Council) acknowledged your notice to modify this existing telecommunications facility in Orange, Connecticut, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here, and in your notice dated December 10, 1999. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/SLL/sll

cc: Honorable Mitchell R. Goldblatt, First Selectman, Town of Orange
Sandy M. Carter, Manager – Regulatory, Bell Atlantic Mobile
Peter W. van Wilgen, Director – Real Estate Operations, SNET Wireless, Inc.
Ronald C. Clark, Manager – Real Estate Operations, Nextel Communications, Inc.
Steve Kotfila, Site Development Manager, Sprint PCS
J. Brendan Sharkey, Esq., Omnipoint Communications

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

December 14, 1999

Honorable Mitchell R. Goldblatt
First Selectman
Town of Orange
617 Orange Center Road
Orange, CT 06477-2423

RE: EM-AT&T-107-991213 - AT&T Wireless PCS notice of intent to modify an existing telecommunications tower located at 525 Orange Center Road in Orange, Connecticut. (Docket No. 177A).

Dear Mr. Goldblatt:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

The Council will consider this item at the next meeting scheduled for Monday, December 20, 1999, at 1:30 p.m. in Hearing Room Two, Ten Franklin Square, New Britain, Connecticut.

Please call me or inform the Council if you have any questions or comments regarding this proposal.

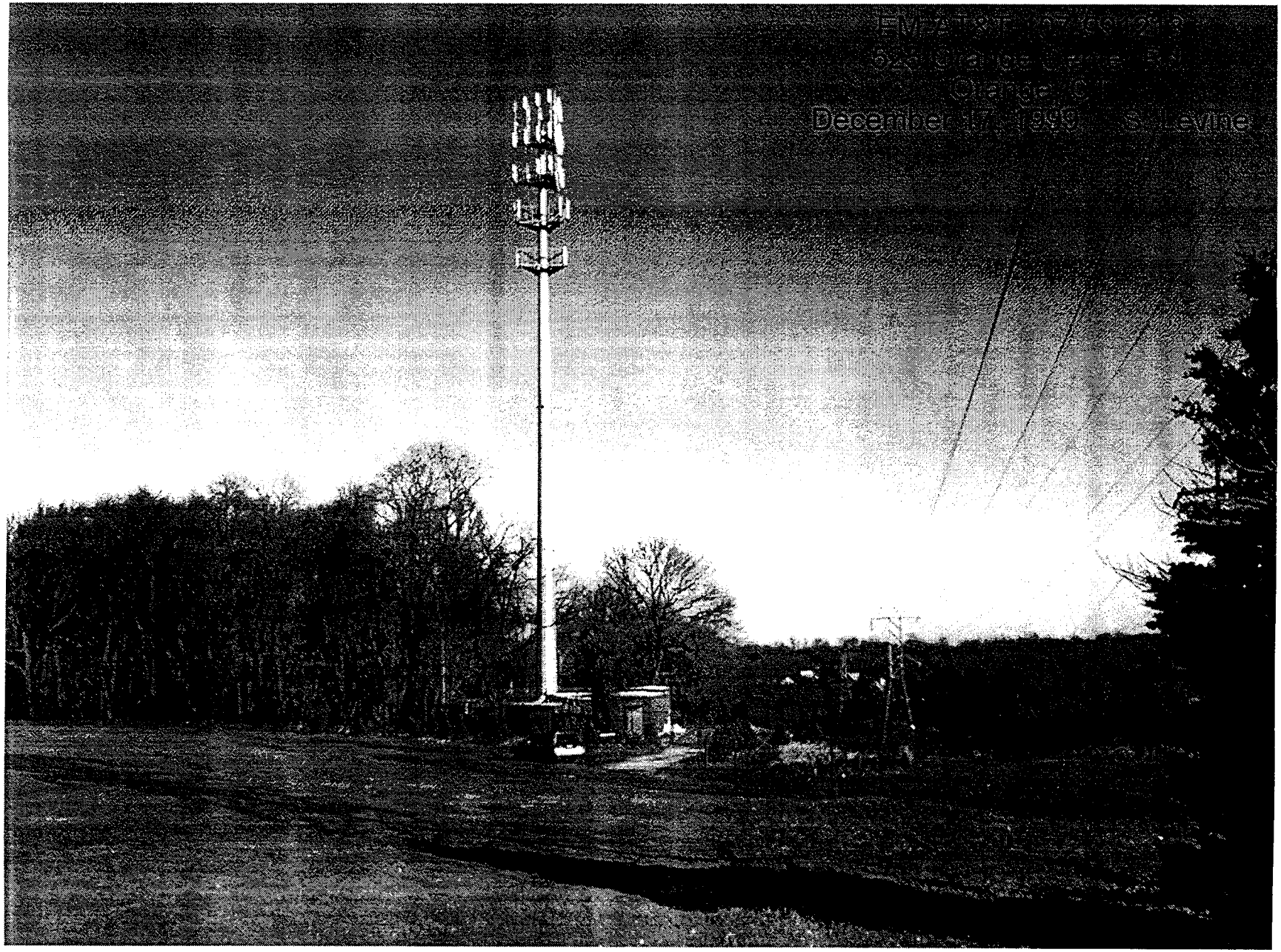
Thank you for your cooperation and consideration.

Very truly yours,

Joel M. Rinebold
Executive Director

JMR/jlh

Enclosure: Notice of Intent


EMR AT&T
Orange
December 17, 1998
S. Levine

CUDDY & FEDER & WORBY LLP

90 MAPLE AVENUE
WHITE PLAINS, NEW YORK 10601-5196

(914) 761-1300
TELECOPIER (914) 761-5372/6405
www.cfwlaw.com

New York City Office
230 PARK AVENUE
NEW YORK, NEW YORK 10169
(212) 949-6280
TELECOPIER (212) 949-6346

Connecticut Offices
733 SUMMER STREET
STAMFORD, CONNECTICUT 06901
(203) 348-4780

4 BERKELEY STREET
NORWALK, CONNECTICUT 06850
(203) 853-8001
TELECOPIER (203) 831-8250

NEIL J. ALEXANDER (also CT)
DAVID I. BASS (also CT)
THOMAS R. BEIRNE (also D.C.)
JOSEPH P. CARLUCCI
KENNETH J. DUBROFF
ROBERT FEDER
CHRISTOPHER B. FISHER (also CT)
KAREN G. GRANIK
JOSHUA J. GRAUER
WAYNE E. HELLER (also CT)
KENNETH F. JURIST
MICHAEL L. KATZ (also NJ)
JOSHUA E. KIMERLING (also CT)
DANIEL F. LEARY (also CT)
BARRY E. LONG

CUDDY & FEDER
1971-1995

ISAAC MARCUS (also CT, NJ)
WILLIAM S. NULL
MARYANN M. PALERMO
NEIL T. RIMSKY
RUTH E. ROTH
CHAUNCEY L. WALKER (also CA)
ROBERT L. WOLFE
DAVID E. WORBY

Of Counsel
LAUREEN J. PETERSON-COLASACCO (also CT)
MICHAEL R. EDELMAN
ANDREW A. GLICKSON (also CT)
DEBORAH S. LEWIS (also CT)
ROBERT L. OSAR (also TX)
ROBERT C. SCHNEIDER
LOUIS R. TAFFERA

December 10, 1999

VIA FEDERAL EXPRESS
Mr. Joel M. Rinebold
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: AT&T Wireless Services
Notice of Exempt Modification
Siting Council Docket No. 177A
525 Orange Center Road, Orange, Connecticut

Dear Mr. Rinebold:

On behalf of AT&T Wireless PCS, LLC, d/b/a AT&T Wireless Services, Inc., we respectfully enclose an original and twenty copies of its notice of exempt modification with respect to the above mentioned facility, together with a check for $500.00, the filing fee. We would appreciate it if this matter were placed on the next available agenda for acknowledgment by the Council. Should the Council or staff have any questions regarding this matter, please do not hesitate to contact us.

Very Truly Yours,

Linda Grant

Linda Grant

cc: Christopher B. Fisher, Esq.
Ms. Carmen Chapman
First Selectman Town of Orange

NOTICE OF INTENT TO MODIFY A TOWN OF ORANGE OWNED FACILITY SITING COUNCIL DOCKET NO. 177A
525 ORANGE CENTER ROAD, ORANGE, CONNECTICUT

Pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes §§ 16-50g - 16-50aa ("PUESA"), and Sections 16-50j-72(b)(2) and 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A.") adopted pursuant to the PUESA, AT&T Wireless PCS, LLC, by and through its agent AT&T Wireless Services, Inc. ("AT&T Wireless") hereby notifies the Connecticut Siting Council of its intent to modify an existing facility located at 525 Orange Center Road, Orange, Connecticut (the "Orange Center Road Facility"). The Town of Orange ("Town") owns the tower site at the High Plains Community Center located on Orange Center Road. The facility was constructed and is operated pursuant to a Certificate issued by the Siting Council in Docket No. 177A. AT&T Wireless has entered into an agreement with the Town to permit the installation of a wireless communications facility at the existing Orange Center Road Facility. See license signature page annexed hereto as Exhibit A. In accordance with R.C.S.A. Section 16-50j-73, a copy of this letter is being sent to the First Selectman of the Town of Orange.

The Orange Center Road Facility

The existing Orange Center Road Facility consists of a 160 foot monopole tower and related equipment located behind the High Plains Community Center. The facility was approved by the Council on August 6, 1997. The tower currently supports antennas of Bell Atlantic Mobile, Nextel Communications of the Mid-Atlantic, Inc., Springwich Cellular Limited Partnership, Sprint Spectrum, L.P. and Omnipoint Communications, Inc. A fence surrounds the Tower and equipment shelters. The surrounding area consists of a community center, fields and a transmission line and is largely unchanged since the tower was issued a Certificate by the Council.

AT&T Wireless Facility

As shown on the enclosed plans prepared by URS Greiner Woodward Clyde, including a site plan and tower elevation of the Orange Center Road Facility, AT&T Wireless proposes shared use of the Facility by placing antennas on the Tower and equipment cabinets on a concrete pad within the existing compound. AT&T Wireless will install up to twelve (12) panel-type antennas mounted on the tower with a center line at approximately the 111 foot level. The tower has been analyzed, and is structurally capable of supporting AT&T Wireless' use as set forth in a letter from URS Greiner Woodward Clyde annexed hereto as Exhibit B.

AT&T Wireless' Facility Constitutes An Exempt Modification

The proposed addition of AT&T Wireless' antennas and equipment to the Orange Center Road Facility constitutes an "exempt modification" of an existing facility as set forth in R.C.S.A. Section 16-50j-72(b)(2). Addition of AT&T Wireless' antennas and equipment to the Tower:

1. Will not result in an increase of the Tower's height nor extend the site boundaries;
2. Will not increase noise levels by six (6) decibels or more at the Tower's site boundary; and
3. As set forth in report prepared by Bell Laboratories, dated November 13, 1999 and annexed hereto as Exhibit C, would not exceed the total radio frequency electromagnetic radiation power density level adopted by the FCC and Connecticut Department of Health. The "worst case" exposure calculated for the operation of this facility (i.e., calculated at the base of the tower, which represents the closest publicly accessible point within the broadcast field of the antennas) for all carriers, would be approximately 0.3% of the standard

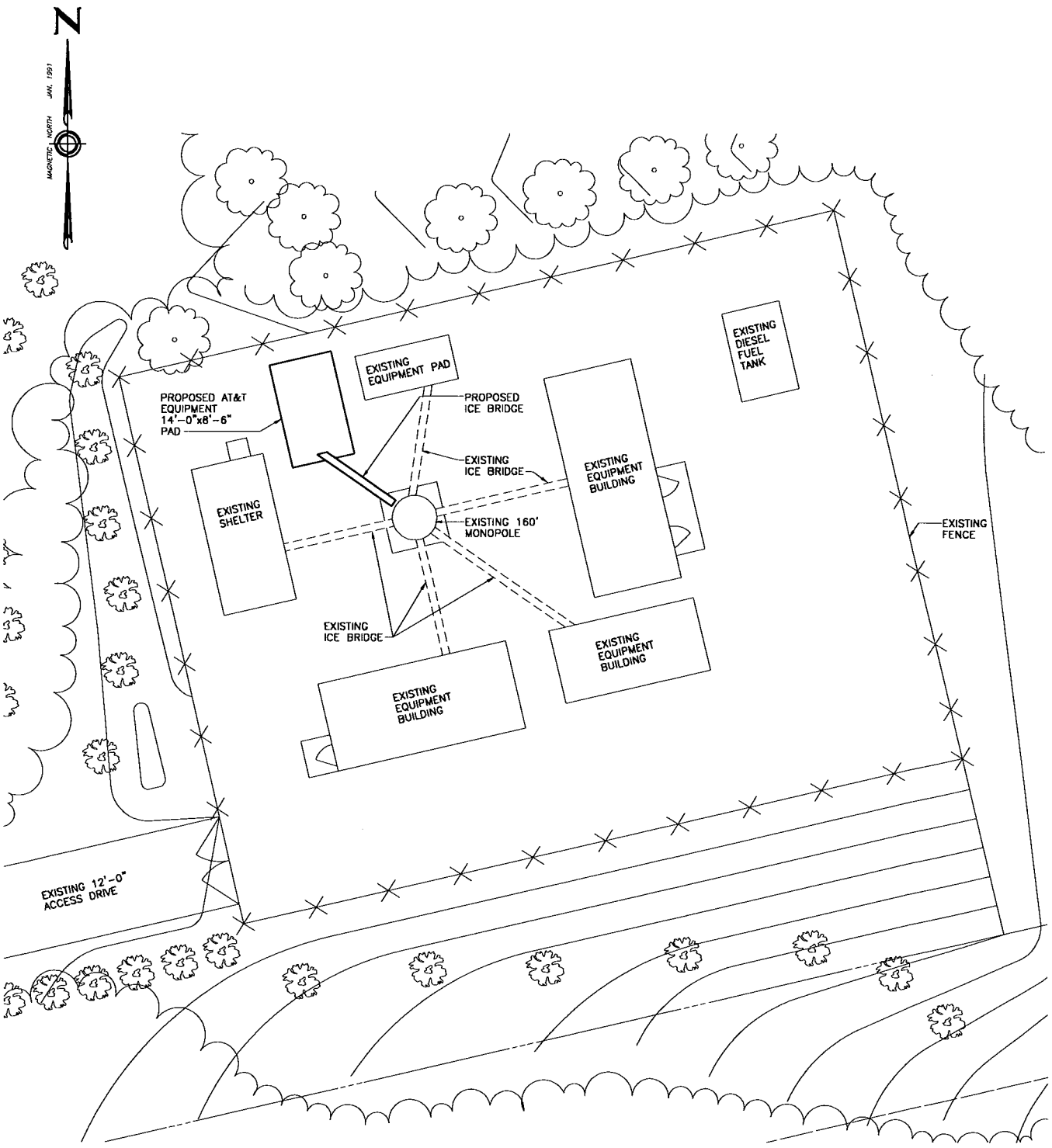
For all the foregoing reasons, addition of AT&T Wireless' facility constitutes an exempt modification under R.C.S.A. Section 16-50j-72(b)(2) which will not have a substantially adverse environmental effect.

Conclusion

Accordingly, AT&T Wireless respectfully requests that the Connecticut Siting Council acknowledge that its proposed modification to the Orange Center Road Facility meets the Council's exemption criteria.

Respectfully Submitted,

Christopher B. Fisher, Esq.
On behalf of AT&T Wireless



1/SC-1 **COMPOUND PLAN**
SCALE: 1"=20'-0"

0 5 10 20 40

158

SITE ID NO: CT-~~100~~

Designed by:

Drawn by: WJK/RFD

Checked by:

URS Greiner Woodward Clyde A·E·S
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

AT&T WIRELESS PCS LLC

UNMANNED WIRELESS COMMUNICATION EQUIPMENT SITE

SITE ADDRESS: **HIGH PLAINS COMMUNITY CENTER**
525 ORANGE CENTER ROAD
ORANGE, CONNECTICUT

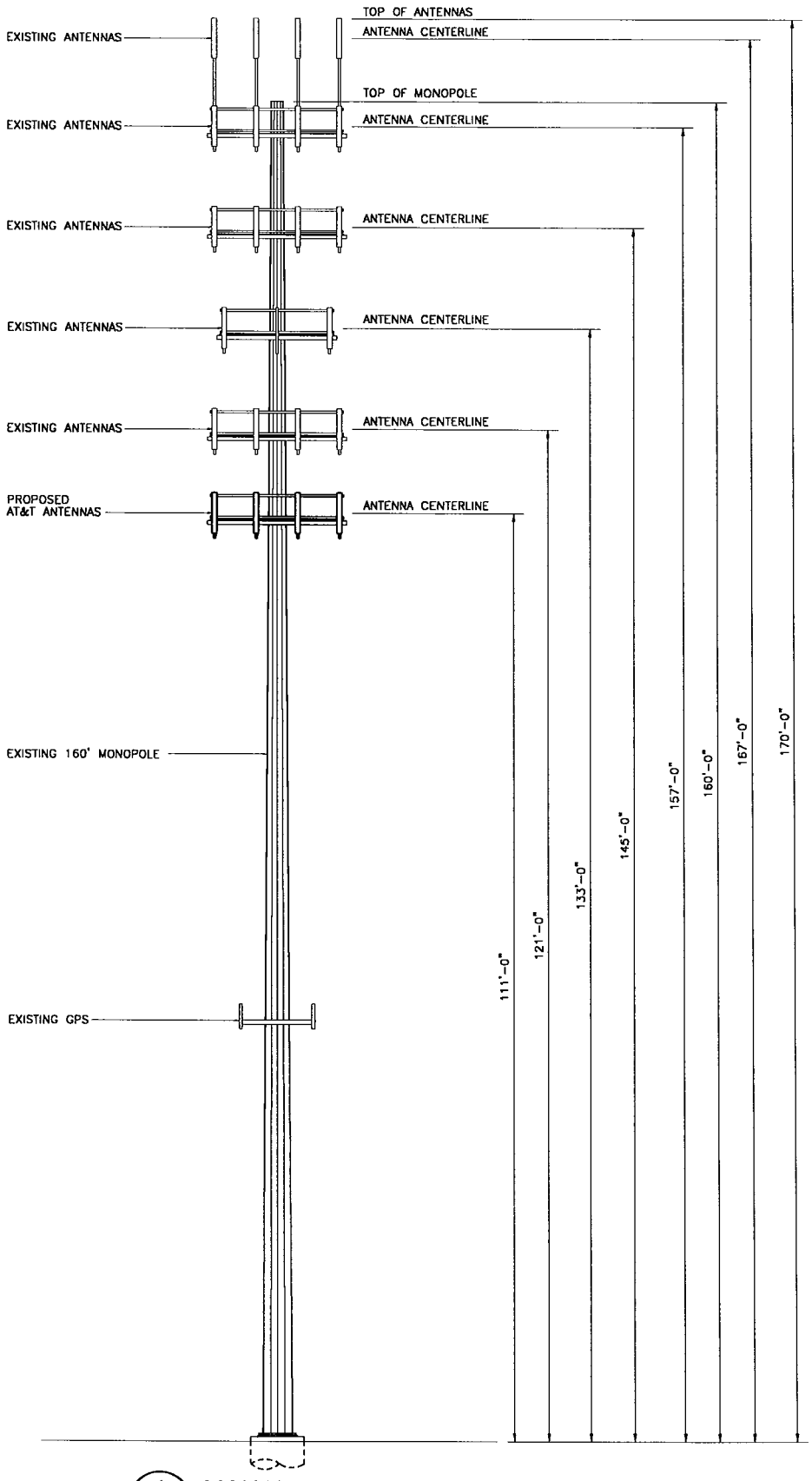
REV.	DATE:	DESCRIPTION

Scale: AS SHOWN | Date: 10-11-99

Job No. F301824.69 | File No. SC-1

Dwg. No. SC-1

Dwg. 1 of 2



1 / SC-2 MONOPOLE ELEVATION

SCALE: 1"=20'

0 5 10 20 40

SITE ID NO: CT-160

Designed by:

Drawn by: WJK/RFD

Checked by:

URS Greiner Woodward Clyde A-E-S
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

AT&T WIRELESS PCS LLC

UNMANNED WIRELESS COMMUNICATION EQUIPMENT SITE

SITE ADDRESS: HIGH PLAINS COMMUNITY CENTER
525 ORANGE CENTER ROAD
ORANGE, CONNECTICUT

REV.	DATE:	DESCRIPTION

Scale: AS SHOWN | Date: 10-11-99

Job No.F301824.69 | File No. SC-2

Dwg. No. SC-2

Dwg. 2 of 2

immediately after this Agreement is executed, will obtain and furnish to LICENSEE, a non-disturbance agreement for each such mortgage or other security interest in recordable form.

32. Personal Property Taxes. LICENSEE shall pay when due all municipal personal property taxes on its equipment and other personal property, not to include the Tower.

33. Notice of License. LICENSOR agrees, from time to time as necessary, to execute a Notice of License Agreement in recordable form which LICENSEE may record in the Orange Land Records.

34. Headings. The headings used in this Agreement are solely for the convenience of the parties and may not be used to construe this Agreement or any of its provisions.

IN WITNESS WHEREOF, the parties hereto have set their hands and affixed their respective seals the day and year first above written.

LICENSOR:
Town of Orange

By: _____

WITNESS

WITNESS

LICENSEE:
AT&T Wireless PCS LLC by and through its agent AT&T Wireless Services, Inc.

By: _____
Paul A. Spurlock
System Development Manager

WITNESS Carmen Chapman

WITNESS

URS Greiner Woodward Clyde
A Division of URS Corporation

500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Tel: 860.529.8882
Fax: 860.529.3991
Offices Worldwide

December 5, 1999

Mortimer A. Gelston
Chairman
Connecticut State Siting Council
10 Franklin Square
New Britain, CT 06051

Reference: Proposed Telecommunications Facility
AT&T Site No. CT-158
Bell Atlantic Mobile Monopole
525 Orange Center Road
Orange, Connecticut
F300001824.69

Dear Mr. Gelston:

URS Greiner Woodward Clyde (URSGWC) has prepared a Structural Analysis for the Bell Atlantic Mobile monopole located at 525 Orange Center Road in Orange, Connecticut. The Structural Analysis was performed by this office and has concluded that the existing monopole will support the additional loads of the AT&T Wireless PCS antennas. This tower analysis was performed to the requirements of EIA/TIA-222-F.

Please contact me if there are any questions.

Sincerely,

URS Greiner Woodward Clyde AES

Ignacio C. Artaiz, AIA
Project Manager

ICA/ms
cc: Carmen Chapman, AT&T
Christopher Fisher, Cuddy Feder & Worby
Jennifer Gaudet, Pinnacle
D. Roberts, URSGWC
A. Abadjian, URSGWC

An Analysis of the Radiofrequency Environment in the Vicinity of a Proposed Personal Communications Services Base Station Site CT-158: 617 Orange Center Road, Orange, Connecticut

Prepared by

Wireless & Optical Technologies Safety Department
Bell Laboratories
Murray Hill, New Jersey 07974-0636

Prepared for

Carmen Chapman
AT&T Wireless Services
15 E. Midland Avenue
Paramus, New Jersey 07652

November 13, 1999

Table of Contents

An Analysis of the Radiofrequency Environment in the Vicinity of a Proposed Personal Communications Services Base Station Site CT-158: 617 Orange Center Road, Orange, Connecticut

Summary

This report is an analysis of the radiofrequency (RF) environment surrounding the AT&T Wireless Services personal communications services (PCS) facility proposed for installation in Orange, CT. The analysis includes contributions from co-located PCS, enhanced specialized mobile radio (ESMR) and cellular radio antennas. The analysis utilizes engineering data provided by AT&T Wireless together with well-established analytical techniques utilized for calculating the RF fields associated with these types of transmitting antennas. Worst-case assumptions were used to ensure safe-side estimates, i.e., the actual values will be significantly lower than the corresponding analytical values. The maximum level of RF energy associated with each transmitting antenna was compared with the appropriate frequency-dependent exposure limit, and these individual comparisons were combined to ensure that the total RF environment is in compliance with safety guidelines.

The results of this analysis indicate that the *total* maximum level of RF energy in normally accessible areas surrounding the installation is below all applicable health and safety limits. Specifically, the maximum level of RF energy associated with *simultaneous and continuous operation of all co-located transmitters* will be less than 0.3% of the safety criteria adopted by the Federal Communications Commission as mandated by the Telecommunications Act of 1996. The Telecommunications Act of 1996 is the applicable Federal law with respect to consideration of the environmental effects of RF emissions in the siting of personal wireless facilities. The total maximum level of RF energy will also be less than 0.3% of the exposure limits of ANSI, IEEE, NCRP and the limits used by all states that regulate RF exposure.

1. Introduction

This report was prepared in response to a request from AT&T Wireless Services for an analysis of the radiofrequency (RF) environment in the vicinity of the proposed personal communications services (PCS) facility, and an opinion regarding the concern for public health associated with long-term exposure in this environment. The analysis includes contributions to the RF environment from operation of co-located PCS, enhanced specialized mobile radio (ESMR) and cellular radio antennas.

The Telecommunications Act of 1996[1] is the applicable *Federal law* with respect to consideration of environmental effects of RF emissions in the siting of wireless facilities. Regarding personal wireless services, e.g., PCS, ESMR and cellular radio, Section 704 of the Telecommunications Act of 1996 states the following:

> "No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions."

Therefore, the purpose of this report is to ensure that the total RF environment associated with these facilities complies with Federal Communications Commission (FCC) guidelines as required by the Telecommunications Act of 1996.

2. Technical Data

The proposed AT&T Wireless Services PCS antennas are to be mounted to a monopole located at 617 Orange Center Road in Orange, CT. Co-located at the installation are Omnipoint Communications and Sprint Spectrum PCS antennas, Nextel Communications enhanced specialized mobile radio (ESMR) antennas, Southern New England Telephone (SNET) and Bell Atlantic Mobile cellular radio antennas. PCS antennas transmit at frequencies between 1930 and 1990 million-hertz (MHz); ESMR antennas transmit between 851 and 866 MHz; cellular radio antennas transmit between 869 and 894 MHz.

The actual RF power propagated from a PCS, ESMR or cellular radio antenna is usually less than 10 watts per transmitter (channel) and the actual *total* RF power is usually less than 200 watts per sector (assuming the maximum number of transmitters are installed and operate *continuously at maximum power*). These are extremely low power systems when compared with other familiar radio systems such as AM, FM, and television broadcast, which operate upwards of 50,000 watts. The attached figure, which depicts the electromagnetic spectrum, lists familiar uses of RF energy. Table 1 lists engineering specifications for the co-located installations.

3. Environmental Levels of RF Energy

The antennas used for PCS, ESMR and cellular radio propagate most of the RF energy in a relatively narrow beam (in the vertical plane) directed toward the horizon. The small amount of energy that is directed along radials below the horizon results in a RF environment directly under the antennas that is not remarkably different from the environment at points more distant.

The methodology used to calculate the exposure levels follows that outlined by the FCC in OET Bulletin No. 65[1] and is explained in detail in the attached Appendix. For the case at hand, the maximal potential exposure levels associated with *simultaneous and continuous operation* of all proposed and existing transmitters can be readily calculated at any point in a plane at any height above grade. Based on the information shown in Table 1, the maximum power densities associated with all co-located facilities are shown in Table 2 for 6 ft and 16 ft above grade. The values for 16 ft above grade are representative of the maximum power densities immediately outside the second floor of nearby buildings (assuming level terrain). The values in Table 2 are also shown as a percentage of the FCC's maximum permissible exposure (MPE) values found in the Telecommunications Act of 1996 (specifically, in the FCC *Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation* [2]).

These power density values are the theoretical maxima that could occur and are not typical values. For example, the calculations include the effect of 100% field reinforcement from in-phase reflections. The assumption was also made that each transmitter operates continuously at maximum power. However, the intermittent nature of the transmission from a cellular radio system will result in time-weighted-average values that will be lower than those shown in Table 2. Experience has shown that the analytical technique used is extremely conservative. That is, actual power density levels have always been found to be smaller than the corresponding calculated levels even when extrapolated to maximum use conditions (all transmitters operating simultaneously at maximum power) [3]. Also, levels inside nearby homes and buildings will be lower than those immediately outside because of the high attenuation of common building materials at these frequencies and, hence, will not be significantly different from typical ambient levels.

4. Comparison of Environmental Levels with RF Safety Criteria

Table 2 shows the calculated maximal RF power density levels in the vicinity of the proposed and existing antennas; Table 3 shows federal, state and consensus exposure limits for human exposure to RF energy at the frequencies of interest. Because the MPEs vary with frequency, the calculated RF levels for each transmitting antenna must first be compared with the appropriate MPE (the individual percentages are shown in Table 2) and then these comparisons combined before compliance with safety guidelines can be shown. With respect to FCC limits for public exposure, comparisons of the weighted and combined analytical results indicate that the maximal levels associated with these antennas is at least 333 times below the MPE, i.e., less than 0.3% of the MPE.

5. Discussion of Safety Criteria

Publicity given to speculation about possible associations between health effects and exposure to magnetic fields from electric-power distribution lines, electric shavers and from the use of hand-held cellular telephones has heightened concern among some members of the public about the possibility that health effects may be associated with any exposure to electromagnetic energy. Many people feel uneasy about new or unfamiliar technology and often want absolute proof that something is safe. Such absolute guarantees are not possible since it is virtually impossible to prove that something does not exist. However, sound judgments can be made as to the safety of a physical agent based on the weight of the pertinent scientific evidence. This is exactly how safety guidelines are developed.

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1. Federal Communications Commission Office of Engineering & Technology, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Radiation,* OET Bulletin No. 65, Edition 97-01 (August 1997).

The overwhelming weight of scientific evidence unequivocally indicates that biological effects associated with exposure to RF energy are threshold effects, i.e., unless the exposure level is sufficiently high the effect will not occur regardless of exposure duration. (Unlike ionizing radiation, e.g., X-rays and nuclear radiation, repeated exposures to low level RF radiation, or nonionizing radiation, are not cumulative.) Thus, it is relatively straightforward to derive safety limits. By adding safety factors to the threshold level at which the most sensitive effect occurs, conservative exposure guidelines have been developed to ensure safety.

At present, there are more than 10,000 reports in the scientific literature which address the subject of RF bioeffects. These reports, most of which describe the results of epidemiology studies, animal and cell-culture studies, have been critically reviewed by leading researchers in the field and all new studies are continuously being reviewed by various groups and organizations whose interest is developing health standards. These include the U.S. Environmental Protection Agency, the National Institute for Occupational Safety and Health, the National Council on Radiation Protection and Measurements, the standards committees sponsored by the Institute of Electrical and Electronics Engineers, the International Radiation Protection Association under the sponsorship of the World Health Organization, and the National Radiological Protection Board of the UK. All of these groups have recently either reaffirmed existing health standards, developed and adopted new health standards, or proposed health standards for exposure to RF energy.

For example, in 1986, the National Council on Radiation Protection and Measurements (NCRP) published recommended limits for occupational and public exposure[4]. These recommendations were based on the results of an extensive critical review of the scientific literature by a committee of the leading researchers in the field of bioelectromagnetics. The literature selected included many controversial studies reporting effects at low levels. The results of all studies were weighed, analyzed and a consensus obtained establishing a conservative threshold upon which safety guidelines should be based. This threshold corresponds to the level at which the most sensitive, reproducible effects that could be related to human health were reported in the scientific literature. Safety factors were incorporated to ensure that the resulting guidelines would be at least ten to fifty times lower than the established threshold, even under worst-case exposure conditions. The NCRP recommended that continuous occupational exposure or exposure of the public should not exceed approximately those values indicated in Table 3. (See Table 3 for a summary of the corresponding safety criteria recommended by various organizations throughout the world.)

In July of 1986, the Environmental Protection Agency published a notice in the Federal Register, calling for public comment on recommended guidance for exposure of the public[5]. Three different limits were proposed. In 1987 the EPA abandoned its efforts and failed to adopt official federal exposure guidelines. However, in 1993 and 1996 the EPA, in its comments on the FCC's Notice of Proposed Rule Making to adopt safety guidelines[6], recommended adoption of the 1986 NCRP limits[4].

In September 1991, the RF safety standard developed by Subcommittee 4 of the Institute of Electrical and Electronics Engineers (IEEE) Standards Coordinating Committee SCC-28 was approved by the IEEE Standards Board[7]. (Until 1988 IEEE SCC-28 was known as the American National Standards Institute (ANSI) C95 Committee—established in 1959.) In November 1992, the ANSI Board of Standards Review approved the IEEE standard for use as an American National Standard. The limits of this standard are identical to the 1982 ANSI RFPGs[8] for occupational exposure and approximately one-fifth of these values for exposure of

the general public at the frequencies of interest. Like those of the NCRP, these limits resulted from an extensive critical review of the scientific literature by a large committee of preeminently qualified scientists, most of whom were from academia and from research laboratories of federal public health agencies.

The panels of scientists from the World Health Organization's International Commission on Non-Ionizing Radiation Protection (ICNIRP)[9] and the National Radiological Protection Board in the United Kingdom[10] independently developed and in 1993 published guidelines similar to those of ANSI/IEEE. In 1997, after another critical review of the latest scientific evidence, ICNIRP reaffirmed the limits published in 1993[11]. Also, what was formerly the USSR, which traditionally had the lowest exposure guides, twice has revised upward its limits for public exposure. Thus, there is a converging consensus of the world's scientific community as to what constitutes safe levels of exposure.

Finally, in implementing the National Environmental Policy Act regarding potentially hazardous RF radiation from radio services regulated by the FCC, the Commission's Rules require that licensees filing applications after January 1, 1997[2] ensure that their facilities will comply with the 1996 FCC MPE limits outlined in 47 CFR §1.1310[2][3]. (Under the terms of the Telecommunications Act of 1996, no local government may regulate the placement of wireless facilities based on RF emissions to the extent that these emissions comply with the FCC regulations [1].)

With respect to the co-located antennas, be assured that the actual exposure levels in the vicinity of the Orange, CT installation will be below any health standard used anywhere in the world and literally thousands of times below any level reported to be associated with any verifiable functional change in humans or laboratory animals. This holds true even when all transmitters operate *simultaneously and continuously at their highest power*. Power density levels of this magnitude are not even a subject of speculation with regard to an association with adverse health effects.

6. For Further Information

Anyone interested can obtain additional information about the environmental impact of PCS, ESMR and cellular radio communications from:

Dr. Robert Cleveland, Jr.
Federal Communications Commission
Office of Engineering and Technology
Room 7002
2000 M Street NW
Washington, DC 20554
(202) 418-2422

2. The FCC extended the transition period to October 15, 1997. Second Memorandum Opinion and Order and Notice of Proposed Rulemaking, ET Docket 93-62, FCC 97-303, adopted August 25, 1997. Prior to this date the FCC required most licensees to comply with 1982 ANSI C95.1 limits.

3. Although all FCC licensees will be required to comply with 47 CFR §1.1310 limits, the FCC will continue to exclude certain land mobile services from proving compliance with these limits 47 CFR §1.1307. Previously, although licensees had to comply with the 1982 ANSI C95.1 limits, the FCC categorically excluded land mobile services, including paging, cellular, ESMR and two-way radio, from hazard analyses because "individually or cumulatively they do not have a significant effect on the quality of the human environment"[12]. The FCC pointed out that there was no evidence of excessive exposure to RF radiation during routine normal operation of these radio services.

7. Conclusion

This report is an analysis of the radiofrequency (RF) environment surrounding the AT&T Wireless Services personal communications services (PCS) facility proposed for installation in Orange, CT. The analysis includes contributions from co-located PCS, enhanced specialized mobile radio (ESMR) and cellular radio antennas. The analysis utilizes engineering data provided by AT&T Wireless together with well-established analytical techniques utilized for calculating the RF fields associated with these types of transmitting antennas. Worst-case assumptions were used to ensure safe-side estimates, i.e., the actual values will be significantly lower than the corresponding analytical values. The maximum level of RF energy associated with each transmitting antenna was compared with the appropriate frequency-dependent exposure limit, and these individual comparisons were combined to ensure that the total RF environment is in compliance with safety guidelines.

The results of this analysis indicate that the *total* maximum level of RF energy in normally accessible areas surrounding the installation is below all applicable health and safety limits. Specifically, the maximum level of RF energy associated with *simultaneous and continuous operation of all co-located transmitters* will be less than 0.3% of the safety criteria adopted by the Federal Communications Commission as mandated by the Telecommunications Act of 1996. The Telecommunications Act of 1996 is the applicable Federal law with respect to consideration of the environmental effects of RF emissions in the siting of personal wireless facilities. The total maximum level of RF energy will also be less than 0.3% of the exposure limits of ANSI, IEEE, NCRP and the limits used by all states that regulate RF exposure.

8. References

[1] Telecommunications Act of 1996, Title VII, Section 704, *Facilities Siting; Radio Frequency Emissions Standards*

[2] Federal Communication Commission 47 CFR Parts 1, 2, 15, 24 and 97. "*Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation.*" (August 6, 1996)

[3] Petersen, R.C., and Testagrossa, P.A., "Radiofrequency Fields Associated with Cellular-Radio Cell-Site Antennas," *Bioelectromagnetics*, Vol. 13, No. 6. (1992)

[4] *Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields,* NCRP Report No. 86, National Council on Radiation Protection and Measurements, Bethesda, MD. (1986)

[5] Federal Register, Vol. 51, No. 146, Wednesday, July 30, 1986.

[6] Notice of Proposed Rule Making *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, August 13, 1993. ET Docket No. 93-62

[7] *IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,* ANSI/IEEE C95.1-1992, Institute of Electrical and Electronics Engineers, Piscataway, NJ. (1991)

[8] American National Standard *Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz,* ANSI C95.1-1982, American National Standards Institute, New York, NY. (1982)

[9] *Electromagnetic Fields (300 Hz to 300 GHz),* Environmental Health Criteria 137, World Health Organization, Geneva, Switzerland. (1993)

[10] *Board Statement on Restrictions on Human Exposure to Static and Time Varying Electromagnetic Fields and Radiation,* Documents of the NRPB, Vol. 4, No. 5, National Radiological Protection Board, Chilton, Didcot, Oxon, United Kingdom. (1993)

[11] "Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz) - ICNIRP Guidelines," *Health Physics*, Vol. 74, No. 4, pp. 494-522. (1998)

[12] Action by the Commission February 12, 1987, by Second Report and Order (FCC 87-63), and Third Notice of Proposed Rulemaking (FCC 87-64). General Docket No. 79-144.

Table 1: Engineering Specifications for the Proposed and Existing Radio Systems
Orange, CT

Site Specifications	AT&T Wireless	Omnipoint	Sprint Spectrum	SNET	Bell Atlantic Mobile	Nextel
maximum ERP† per channel	100 watts	300 watts	412 watts	100 watts	100 watts	100 watts
actual radiated power per channel	4 watts	11 watts	13 watts	6.3 watts	8 watts	8 watts
actual *total* radiated power per sector	32 watts	22 watts	52 watts	126 watts	160 watts	64 watts
number of transmit/receive antennas	N/A	2 per sector	2 per sector	N/A	N/A	4per sector
number of transmit antennas	1 per sector	N/A	1 per sector	1 per sector	1 per sector	N/A
number of receive antennas	2 per sector	N/A	N/A	2 per sector	2 per sector	N/A
maximum number of transmitters	8 per sector	2 per sector	4 per sector	20 per sector	20 per sector	8 per sector
number of sectors configured	3	3	3	3	3	3
antenna centerline height above grade	111 ft	121 ft	133 ft	145 ft	157 ft	167 ft
antenna manufacturer	Allgon	EMS Wireless	DAPA	Swedcom	Swedcom	Swedcom
model number	7184.14	RR90-17-00DP‡	58000‡	ALP 9212‡	ALP E-9011‡	ALP E-9011‡
gain	16.15 dBi	16.5 dBi	17.15 dBi	14.15 dBi	13.15 dBi	13.15 dBi
type	directional	directional	directional	directional	directional	directional
downtilt	2° (electrical)	0°	0°	0°	0°	0°

† *Effective Radiated Power* - ERP is a measure of how well an antenna concentrates RF energy; it is not the actual power radiated from the antenna. To illustrate the difference, compare the brightness of an ordinary 100 watt light bulb with that from a 100 watt spot-light. Even though both are 100 watts, the spot-light appears brighter because it concentrates the light in one direction. In this direction, the spot-light effectively appears to be emitting more than 100 watts. In other directions, there is almost no light emitted by the spot-light and it effectively appears to be much less than 100 watts.

‡ or similar antenna.

Table 2: Calculated Maximal Levels and the Levels as a Percentage of 1996 FCC MPEs* for the Proposed and Existing Antennas, Orange, CT

Provider	Power Density (mW/cm^2)		% of MPEs*	
	6 ft AMGL†	16 ft AMGL†	6 ft AMGL†	16 ft AMGL†
AT&T Wireless				
maximum anywhere	< 0.00024	< 0.00030	0.03%	0.03%
at base of structure	< 0.00012	< 0.00014	0.02%	0.02%
Omnipoint				
maximum anywhere	< 0.00010	< 0.00012	0.01%	0.02%
at base of structure	< 0.00003	< 0.00003	0.01%	0.01%
Sprint Spectrum				
maximum anywhere	< 0.00027	< 0.00032	0.03%	0.04%
at base of structure	< 0.00011	< 0.00013	0.02%	0.02%
SNET				
maximum anywhere	< 0.00014	< 0.00016	0.03%	0.03%
at base of structure	< 0.00001	< 0.00002	0.01%	0.01%
Bell Atlantic Mobile				
maximum anywhere	< 0.00059	< 0.00068	0.11%	0.13%
at base of structure	< 0.00002	< 0.00003	0.01%	0.01%
Nextel Communications				
maximum anywhere	< 0.00021	< 0.00024	0.04%	0.05%
at base of structure	< 0.00001	< 0.00001	0.01%	0.01%
TOTAL				
maximum anywhere			0.25%	0.30%
at base of structure			0.08%	0.08%

* MPE: The FCC limits for maximum permissible exposure (same as 1986 NCRP limits at the frequencies of interest).
† AMGL: above mean grade level

Table 3: Summary of International, Federal, State and Consensus Safety Criteria for Exposure to Radiofrequency Energy at Frequencies Used for PCS, Cellular Radio and ESMR

Organization/Government Agency	Exposure Population	Power Density (mW/cm^2)	
		Cellular Radio & ESMR	PCS
International Safety Criteria/Recommendations			
International Commission on Non-Ionizing Radiation Protection (1997)	Occupational	2.07	4.88
(*Health Physics* 74:4, 494-522. 1998)[1]	Public	0.42	0.98
National Radiological Protection Board	Occupational	5.00	10.00
(NRPB, 1993)	Public	2.79	10.00
Federal Requirements			
Federal Communications Commission	Occupational	2.75	5.00
(47 CFR §1.1310)	Public	0.55	1.00[1]
Consensus Standards and Recommendations			
American National Standards Institute	Occupational	2.75	5.00
(ANSI C95.1 - 1982)	Public	2.75	5.00
Institute of Electrical and Electronics Engineers	Occupational	2.75	6.50
(ANSI/IEEE C95.1-1999 Edition)[2]	Public	0.55	1.30
National Council on Radiation Protection & Measurements	Occupational	2.75	5.00
(NCRP Report 86, 1986)	Public	0.55	1.00
State Codes			
New Jersey (NJAC 7:28-42)	Public	2.75	5.00
Massachusetts (Department of Health 105 CMR 122)	Public	0.55	1.00
New York State[3]	Public	0.55	1.00

NOTES:
1. Reaffirmed in 1997 and published with modification in 1998.
2. Incorporating IEEE Standard C95.1-1991 and IEEE Standard C95.1a-1998.
3. State of New York Department of Health follows NCRP Report 86.

APPENDIX - Analytical Technique

This appendix describes the methodology used to predict the radiofrequency (RF) electromagnetic environment surrounding the proposed AT&T PCS antennas and all co-located wireless communications antennas. As a conservative measure, the methodology applies "worst-case" conditions that result in an over-estimate of the RF environment, e.g., the calculations include the effect of field reinforcement from in-phase reflections. Therefore, the predicted values are the theoretical maxima that could occur and not typical values. The actual power density levels have always been found to be smaller than the corresponding predicted levels[4]. The methodology described follows that outlined by the Federal Communications Commission (FCC) in their OST Bulletin No. 65[5].

For each transmitting antenna, the maximum RF power density at 6 ft above grade was estimated by performing a series of power density predictions for depression angles below the horizon from 5° to 90°. This was done using the vertical gain pattern of each antenna provided by the antenna manufacturer and by using the following equation:

$$S = \left(\frac{N \times P_N \times G_\theta \times 1.64}{4\pi R^2} \right)$$

and

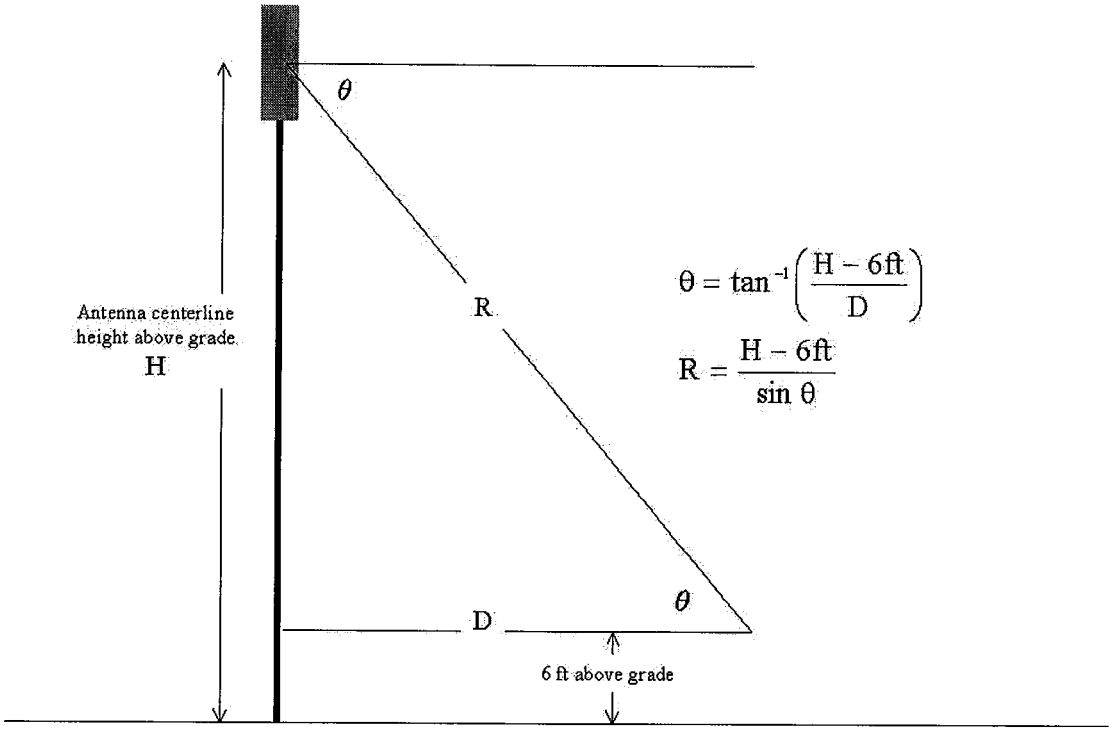
$$S_{max} = 4 \times S$$

where:

S	= plane wave equivalent power density
S_{max}	= factor of 4 assumes a 100% ground reflection (resulting in a doubling of the field strength and a four-fold increase in power density)
N	= maximum number of transmitters (channels)
P_N	= actual power per channel input to the antenna
G_θ	= far-field gain (numeric) of the antenna relative to a half-wave dipole in the direction of point of interest
R	= distance (radial or slant) from the antenna center to point of interest
1.64	= gain of a half-wave dipole (2.15 dB) over an isotropic radiator

4. Petersen, R.C., and Testagrossa, P.A., Radiofrequency Fields Associated with Cellular-Radio Cell-Site Antennas, *Bioelectromagnetics, Vol. 13, No. 6 (1992).*

5. Federal Communications Commission Office of Engineering & Technology, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Radiation,* OET Bulletin No. 65, Edition 97-01 (August 1997).



Based on the technical specifications for the site outlined in Table 1, the maximum RF power density (S_{max}) associated with the AT&T PCS antennas occurs at a depression angle of 30° below the horizon and is calculated as follows:

$$R = (H-6)/\sin\theta = (117-6)/\sin(30°) = 210 \text{ ft}$$

$G_{30°} = -2.2$ dBd (from antenna elevation gain pattern)

$$P_N = ERP/G_{max} = \frac{100}{10^{(14dBd/10)}} = 3.98 \text{ watts per channel}$$

$$S_{max} = 4 \times \frac{N \times P_N \times 10^{(G\theta/10)} \times 1.64}{4 \times \pi \times R^2}$$

$$S_{max} = 4 \times \frac{8ch \times 3.98W/ch \times 10^{(-2.2dBd/10)} \times 1.64}{4 \times \pi \times (210ftx12x2.54)^2}$$

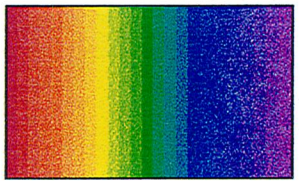
$$S_{max} = 2.4 \times 10^{-7} \text{ W/cm}^2 = 0.00024 \text{ mW/cm}^2$$

ELECTROMAGNETIC SPECTRUM

Non-Ionizing Radiation

Ionizing Radiation

ELF, VF | Radio Frequencies | Infrared | UV | X-rays, γ-rays



AM Radio: *535 - 1605 kHz*
CB Radio: *27 MHz*
Cordless Phones: *49 MHz*
TV Ch 2-6: *54 - 88 MHz*
FM Radio: *88 - 108 MHz*
Marine Radio: *160 MHz*
TV Ch 7-13: *174 - 216 MHz*
TV UHF Ch 14-69: *470 - 800 MHz*
Cellular Radio, Specialized Mobile Radio, Paging: *806 - 946 MHz*
Antitheft devices: *10-20 kHz and/or 915 MHz*
Microwave oven: *915 and 2450 MHz*
Personal Communication Services: *1800 - 2200 MHz*
Intrusion alarms / door openers: *10.5 GHz*
Microwave radio: *1 - 40 GHz*
Satellite Communications: *100 MHz - 275 GHz*

Power Frequency

10^3 10^6 10^9 10^{12} 10^{15} 10^{18}

60 Hz 1kHz 1MHz 1GHz Frequency (Hz) →